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THE WEEKLY SUMMARY OF CURRENT SCIENCE • APRIL 5, 1947



Tree Flowers

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A SCIENCE SERVICE PUBLICATION



Television gives you a choice seat at the game.

Television—a Season Pass to Baseball !

Every home game—day or night—played by the New York Giants, Yankees and Brooklyn Dodgers will be seen over television this season!

Owning a television receiver in the New York area will be like having a season pass for all three ball clubs. And in other cities, preparations for the future telecasting of baseball are being made.

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Radio Corporation of America, RCA Building, Radio City, New York 20. Listen to the RCA Victor Show, Sundays, 2:00 P.M., Eastern Standard Time over the NBC Network.



Several television cameras cover the baseball diamond to bring you a close-up of the action wherever it occurs. Here is a supersensitive RCA Image Orthicon television camera used by NBC's New York station WNBT in televising home games of the New York Giants.



RADIO CORPORATION of AMERICA

MEDICINE

Cosmic Rays in Cancer

Cosmic rays may cause cancer. Experiments link these rays to the disease, and further study will tell more about their role in cancer.

►COSMIC RAYS, which continually bombard us, piercing our bodies from head to toe at a rate of more than 20 times per second, may be the invisible guns that start off cancers.

Experiments which for the first time link cosmic rays with cancer are reported by Dr. Frank H. J. Figge, of the University of Maryland Medical School, in *Science* (March 28).

We will not have to spend our lives in underground shelters to escape cancer-causing cosmic rays, although Dr. Figge does suggest some change in the structure of our buildings. Plastic material might be better than steel and concrete.

The cosmic rays start cancer, he believes, by activating certain chemicals in the body. Some persons may apparently have greater amounts of these chemicals in their bodies than other persons. After all, Dr. Figge points out, not everyone gets cancer.

Avoiding Cancer

The way to avoid cancer, if Dr. Figge's theory proves correct, is to identify the chemicals the rays act on and then to find some way of eliminating or counteracting them.

These chemicals, which Dr. Figge calls sensitizers, are what led him to his new theory of the way cancer starts. Porphyrins, for example, which form the basis for the respiratory pigments such as the hemoglobin of red blood cells, are sensitizers to radiation on the electromagnetic spectrum. Porphyrins occur in abundance in animals susceptible to experimentally induced cancer. About 10% of women produce large amounts of them around the neck of the uterus, or womb, at regular periods. And cancer of the neck (cervix) of the uterus is responsible for about one-third of all cancer in women.

To test his theory, Dr. Figge injected mice with the cancer-causing chemical, methylcholanthrene. He placed some of them in cages with one and two lead plates over the cages. Others were in cages without lead plates. The cages were placed some on the first and some on the fifth floors of a steel and concrete building. The arrangement of cages and plates was such that some mice, those under

the lead plates, would be subjected to showers of more intense cosmic radiation, while others would get only the amount usually found in the atmosphere.

All but two of the 67 control mice and one of the 111 lead-covered mice got cancer. This was to be expected. But the mice under the lead covers developed cancer three weeks earlier, on the average, or in about two-thirds the time, than the mice not under lead covers.

Next week Dr. Figge is going to put on what should be a more conclusive experimental test of his theory. He is going to inject mice with the cancer-causing chemical and then take them 700 feet below the surface of the earth in three coal mines near Pottsville, Pa. At that depth, the mice will not be reached by any cosmic rays. If they fail to develop cancer, it will prove that cosmic rays start off cancers by acting on certain chemicals in the body.

For the duration of the experiment, probably six months, Dr. Figge will go down into the mines every week to examine the animals. Some of the miners

will feed and water the animals and clean their cages in between his visits. Both miners and operators, he says, have been very cooperative.

The fact that the total energy received by the earth as cosmic radiation is no greater than that of starlight has led many to assume that cosmic rays could have little, if any, effect on plant and animal life. Yet a number of known facts support the cosmic ray-cancer theory.

Most Attacks

Cancer attacks people in greater numbers the farther one gets from the geomagnetic equator of the earth. This equator, which lies near but does not exactly parallel the equator of school geography books, is where cosmic radiations are least intense. They grow more intense, and cancer is more frequent, the farther one gets both north and south of the geomagnetic equator.

Farmers and others who live most of their lives outdoors are less subject to internal cancers than persons spending most of their lives in buildings which produce cosmic ray showers and thus intensify the radiation. The skin cancers to which farmers, sailors and others living largely outdoor lives are most subject, are primarily due, Dr. Figge explains, to rays from the sun. And the amount of skin cancer increases as one approaches the equator.

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BLOWING ARMS—Glass-blower's skill is still needed in making intricate radio transmitting tubes. Here a grid connection arm is being attached to a 100,000-watt tube in a General Electric laboratory.

PSYCHIATRY

"Southpaws" Are Made

People learn left-handedness instead of inheriting it and should be taught to use their right hand. Three causes of left-handedness are suggested.

► YOU ARE RIGHT- or left-handed because you learned to be, not because you were born that way and inherited it. Children in our right-handed civilization should be taught to be right-handed.

This revolutionary new theory, that "southpaws" are made, not born, is put forward by Dr. Abram Blau, assistant clinical professor of psychiatry at the New York University College of Medicine and chief psychiatrist at the New York University Clinic.

The newborn infant, according to the new theory, is bilateral with no developed handedness and laterality. This state of no-handedness is typical of animals and primitive peoples. Theoretically, the human baby has a 50-50 chance of becoming either right- or left-handed.

But in humans, Dr. Blau explains, "preference for the right side is a cultural and social convention.

"As soon as we are born, society steps in and commands: 'Thou shalt use thy right hand and not thy left hand!'"

In "The Master Hand," a study of sidedness published by the American Orthopsychiatric Association, Dr. Blau lists three reasons why there are left-handed people in our right-handed so-

ciety.

One cause of sinistrality, or left-sidedness, may be either physical or mental deficiency, Dr. Blau says. Loss of the right hand or arm or some physical defect may force a person to become left-handed. Mental deficiency may hamper a person from normal learning of dexterity, or right-sidedness.

"Low-grade mental defectives," Dr. Blau explains, "are not ambidextrous but ambilateral; they have little dexterity on either side."

"Faulty education" is suggested as a second cause for left-handedness. According to the new theory, the left-handed parents are frequently imitated by their children, who learn to be left-handed, too. This accounts for many cases of seeming inheritance of left-handedness, Dr. Blau believes.

Another type of left-handed education stems from the idea that it is dangerous to change apparently left-handed children to use of their right hand.

He believes the third and most common cause of left-handedness is "emotional negativism." This is simply an active emotional contrariness in early childhood.

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in the tunnel must move over or around such solid objects as walls, guide vanes and propellers.

The most highly developed use of screens to eliminate turbulence is probably in the Moffett Field, California, tunnel completed by the National Advisory Committee for Aeronautics in 1946. This tunnel has a large spherical bulge in which are stretched eight fine-mesh wire screens spaced nine inches apart, each one over 60 feet in diameter. The bulge is just ahead of the test section. The screens effectively eliminate nearly all swirling or turbulence in the air stream.

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PHYSICS

Preventing Air Eddies

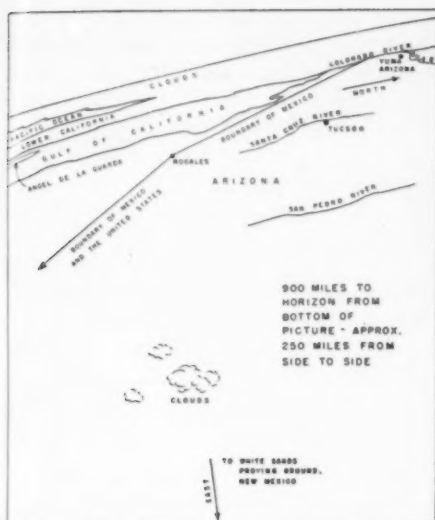
► HOW AIR EDDIES in aviation wind tunnels are eliminated by fine screens, and the development of the method, are revealed in a new report of the National Bureau of Standards.

These eddies, usually referred to as turbulence, create air movements unlike those encountered by a plane traveling through still air. The use of the screens makes turbulence level so low that motion through the air is actually simulated. The use of screens is a development of the National Bureau of Standards in active cooperation with the National Advisory Committee for Aeronautics.

As far as known, the Bureau states, the first observation of a damping effect of a screen on turbulence was made in 1934 in the old Bureau 4½-foot wind

tunnel. A little later, it was observed at NACA laboratories at Langley Field, Virginia, that the steadiness of the air flow through a smoke tunnel was improved by the use of a cloth over the tunnel entrance. However, the usefulness of damping screens was not realized until 1938, when measurements were made by the Bureau showing the amount of turbulence reduction. A year later, the Bureau undertook a systematic investigation with the cooperation and financial assistance of the NACA.

Wind tunnels are devices to produce artificial wind for the testing of scale models of planes or of plane parts. Smoothness and uniformity of air movement in the tunnel are essentials. The swirling is due to the fact that the air



LANDMARKS—This diagram, drawn by the Navy, shows landmarks that can be seen on the photograph of the earth.

METALLURGY

Tougher Alloys Needed For Jet Engines' Heat

► METAL ALLOYS to withstand the the extreme temperatures in jet-propulsion engines was discussed in Cleveland by the National Aircraft Propulsion meeting, Institute of Aeronautical Sciences.

Much progress has been made in developing alloys for jet engines but none are entirely satisfactory. J. W. Freeman, research engineer of the University of Michigan, made what he called some guesses as to future prospects of improved materials. He discussed the fundamental metallurgical principles controlling the properties of the alloys for the types of services, and reviewed the results of chemical composition, heat treatment and processing procedures to date.

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PHOTOGRAPHY

Rocket Cameras Photograph Earth From 100 Miles Up

► FROM 100 miles above the earth, V-2 rocket aerial cameras took a picture that shows the curvature of the earth and more than 200,000 square miles of the United States and Mexico. This is the highest a picture has ever been taken.

Two aerial cameras, carried amidship in the rocket launched at White Sands, N. Mex., on March 7, took pictures through an infra-red filter to cut the



FROM 100 MILES UP—Taken from a V-2 rocket, this is the highest point from which the earth has been photographed. U. S. Navy photo.

haze. Since the force of the rocket blasts a crater into the ground when it returns to earth, the nose and tail of this rocket were blown off by explosives detonated by radio signals to make recovery of cameras easier.

The spectrograph was recovered also, and Navy scientists are studying spectrogram films of the sun taken at an altitude of 100 miles. The Navy and Army are cooperating on the V-2 flights for scientific purposes.

This particular rocket flight was successful in gathering valuable new information in the fields of upper atmospheric pressures and temperatures, cosmic rays, ionosphere investigation and studies of solar spectra.

The time of flight of the rocket was six and one-half minutes.

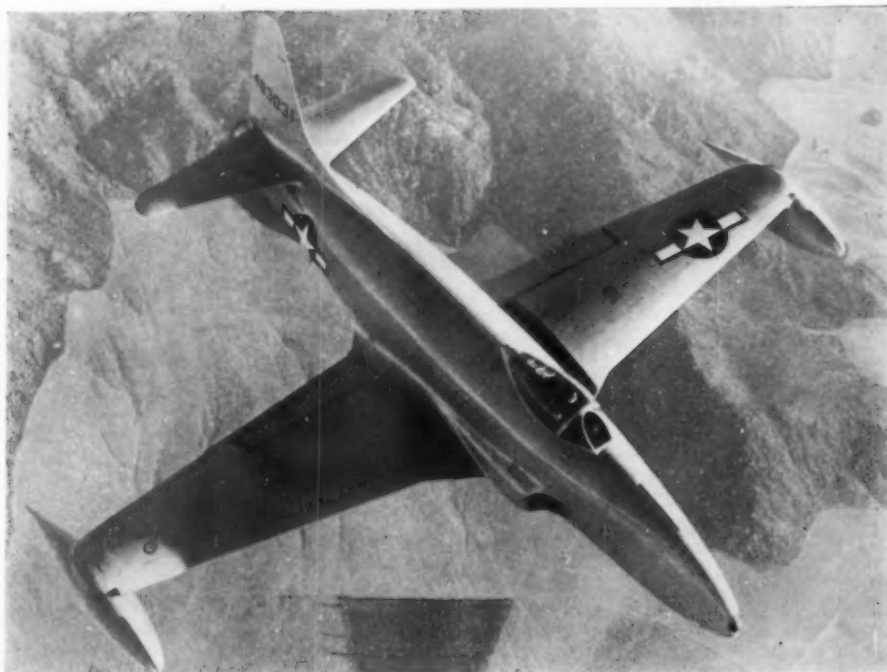
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ENGINEERING

Liquid Propellant Cools Rocket Engine in Motion

► A METHOD of cooling a rocket engine was discussed by Thomas E. Reinhardt of Bell Aircraft Corporation at the National Aircraft Propulsion meeting, Institute of Aeronautical Sciences. Regenerative cooling of a liquid propellant rocket is accomplished, he said, by flowing one of the liquid propellants through a jacket surrounding the combustion chamber and nozzle. The liquid cools the walls of the chamber to a safe operating temperature, and at the same time is itself pre-heated, thereby aiding combustion.

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"SHOOTING STAR"—The Army has contracted for an improved version of the Lockheed P-80 jet fighter shown in this Army Air Forces photograph.

DENTISTRY

Live Teeth Grafted in Cats

Fourteen cats have tooth germ grafting. Tooth banks for human teeth are predicted, but knowledge of bones and blood vessels is needed.

► **POSSIBILITY** of tooth banks being developed at some future date, from which "live" teeth could be obtained as replacements for those that have to be extracted, is seen in studies made by Dr. Harry H. Shapiro of Columbia University.

The first step in this direction has been taken with cats. A developing tooth or "germ" has been removed from a donor cat and grafted into the socket of a host cat from which a tooth had just been removed. The procedure has been carried out in 14 cats. Hosts were older than donors, ranging in age from six months to one year.

X-ray examinations were made before and after the operations and were continued throughout the development of the tooth germ. The germ, not to be confused with the kind that causes disease, is not more than a few millimeters in diameter and its intact removal is a delicate operation.

In cases where the donor tooth was not injured during transplantation, it

developed and grew normally. This was true whether the transplant was the same kind of tooth as the one removed from the host or another kind, as when an incisor was substituted for a canine.

Cats were chosen for the work because the growth cycle of teeth in cats is most like that in humans, and proceeds rapidly so that results could be determined fairly soon. Kittens, like human babies, are born without teeth, acquire a first or "baby" set which they lose and then get a second permanent set. And cats reach maturity in nine months.

Before the results can be applied to humans, much more will have to be learned of bone regeneration, blood vessel regeneration and developing tooth structure. Dr. Shapiro himself will not make any predictions on the future possibilities for humans. Some time ago he received a letter from a Californian placing an order for several transplants, "preferably molars." This is the kind of thing he wants to discourage and prevent.

Dr. Shapiro started his tooth transplants in 1940. Sharing his work was his wife, Dr. Bernice L. MacLean, who died last year. Two of the cats with transplanted teeth were shown at a meeting of the American Association of Anatomists at Cornell Medical College.

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AERONAUTICS

New Edition of Army P-80 "Shooting Star" On Way

► **A NEW EDITION** of the Army's jet-propelled P-80 "Shooting Star", to be known as the P-80B, is on the way.

The Army Air Forces have awarded the manufacturer of the P-80, Lockheed Aircraft Corporation of Burbank, Calif., a contract for a stronger plane of the P-80 type with greater firepower.

New features for the P-80B include:

Thicker skin and stronger bulkheads with a sturdier base for armament.

Stainless steel around the engine for greater fireproofing.

Water injection in the J-33 turbo-jet engine to increase take-off and climb performance.

Natural aluminum finish to get away from the chipped paint which mars the P-80 after it has flown through a rain-storm.

Enclosed radio masts and antenna wires to reduce the drag of the equipment at high speeds.

Refrigeration system to give more comfortable cockpit temperatures at all times.

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PHYSICS

X-Ray Application Made With Electron Microscope

► **THE PRINCIPLE** of the electron microscope is applied in the production of X-rays for the purposes of spectrographic analysis in a setup designed by one of the leading workers in the field, Dr. James Hillier of the Radio Corporation of America, to which firm he has assigned his patent, No. 2,418,029. A beam of electrons is focussed in the customary way on the object to be analyzed. Striking it, the electrons cause the emission of X-rays. A beam of these, screened through a pair of slits, strikes a crystal, which scatters them in characteristic diffraction pattern and permits a photographic record to be made.

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CHEMISTRY

Nylons From Corn Cobs

Sheer stockings will come from the farm. Furfural, obtained from the raw material, is the chemical from which nylon is built.

► **THOSE LOVELY**, sheer nylons—they are going to be synthesized from corn cobs and oat hulls instead of coal, air and water.

Chemists have discovered how to make nylon plastic from waste products from the farm, and Du Pont has begun constructing a new plant at Niagara Falls to make the chemicals of the new nylon process from furfural, a chemical curiosity of a quarter of a century ago.

"Over 100,000 tons of agricultural by-products will be needed to supply the furfural needed by the new plant," Dr. O. W. Cass, of Du Pont's Niagara Falls Research Laboratory, told the Chemurgic Conference in Oklahoma City.

Nylon stockings, panties and other products will be grown down on the farm so far as their basic raw chemical materials are concerned. Now the nylon raw materials are obtained from natural gas, petroleum or coal—and air and water.

"We can now make nylon from materials which are available in practically unlimited quantities because they are grown each year," Dr. Cass explained.

The starting point of furfural, chemical raw material for the new nylon process, may be any one of a wide variety of agricultural by-products—oat hulls, corn cobs, cottonseed hulls, flax shives, bagasse from sugar cane, peanut shells, rice husks or even wood.

One bushel of corn cobs makes 40 pairs of stockings, so far as the basic chemical is concerned, but other chemicals than the principal one are also needed.

A dozen years were required to develop the new nylon process, and laboratory research began in the fall of 1935, three years before nylon was announced to the public. The fundamental nylon process took over a decade of research and pilot plant work.

Two intermediate chemicals that nylon wearers never hear about are combined to produce the finished nylon material. These are called adipic acid and hexamethylene diamine. The conventional process uses phenol or benzene from coal, ammonia from air and water, and oxygen from air.

The new process announced by Dr.

Cass starts with the furfural from cobs or hulls, converts it into adiponitrile and then makes hexamethylene diamine.

A new field of chemistry, based on furfural, and called furan chemistry, was predicted by Dr. Cass, who rated nylon production as just one of many future chemical achievements based on utilization of this kind of waste material.

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MEDICINE

Portal-to-Portal Cleaning Protects Drugs From Dust

► **HERE'S ONE** John L. Lewis and his coal miners seem to have overlooked: portal-to-portal, or at least portal-to-job, dry cleaning of employees' clothes.

It is one of the special features of the new drug manufacturing plant of the Winthrop Chemical Company which recently went into operation.

The object is to keep every speck of dust out of the medicinals made there for hypodermic injection into sick people. Before entering the main building where the medicines are made, employees and

visitors must walk through one of two narrow passages lined with double dedusting blowing and suction units designed to remove lint and dust from their clothing. The 35 compartmented laboratory workrooms where the medicines are prepared are isolated, germ-proofed and air-conditioned for protection of the medicines. Nose and mouth masks and specially designed dust-free gowns must also be worn by everyone entering the weighing, preparation and filling rooms.

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OPTICS

Flare-Absorbing Lenses Protect Glassworkers' Eyes

► **GLASSWORKERS**, fusing glass in sodium flares, are enabled to see work otherwise hidden by the yellow flame by means of new eyeglasses revealed by the American Optical Company.

The lenses of the new eyeglasses contain standard optical glass to which is added a small quantity of a rare metal, didymium. Lenses made of this special glass absorb 90% of the yellow sodium flare of the fusing flame which is caused by the burning of sodium, one of the ingredients of glass. They permit the worker to look through the opaque yellow light emitted and see his work clearly. They protect workers also from the headaches that usually accompany extended work with sodium flames.

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SPICK AND SPAN—In addition to "portal-to-portal" dry cleaning of workers' clothes, this room of the Winthrop laboratories has a special vestibule made to insure 30% humidity. Workers wear lint-free masks and gowns and weigh powders under glass hoods.

PHYSICS

German Microphone Used To Detect Enemy Planes

► ANOTHER GERMAN device for detecting approaching airplanes is now revealed. It is a hot-wire microphone, said to be superior to the older electrostatic and electromagnetic types.

This microphone is for use on patroling aircraft. Unlike other types it does not pick up mechanical vibrations produced by the carrier plane. It is particularly sensitive for sound waves between 50 and 250 cycles per second. With higher cycles its sensitivity decreases considerably.

The microphone looks like a slender projectile about eight inches long. The sound waves enter the microphone by means of six slotted openings at right angles to the throat of a resonator and to the main axis of the device. The throat contains a platinum wire heated by a battery power unit. The temperature of the wire varies with the changing pressure of the sound waves on it. The change in temperature alters the amount of power the wire draws from the battery. A meter indicates the presence of a train of sound waves.

A report on this hot-wire microphone, "A Microphone of the Hot Wire Type," prepared by a British investigator, may now be obtained from the Office of Technical Services, U. S. Department of Commerce, for one dollar. Its 10 pages include diagrams and graphs.

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MEDICINE

Cancer Kills Almost As Many Men as Women

► THE NOTION that cancer is primarily a woman's disease is false, the American Cancer Society states. In 1946, it is estimated, cancer killed 87,777 males and 93,723 females in the United States. The difference is only 6%.

The reason many people think of cancer as a woman's disease is probably because of the large amount of cancer in the female sex organs. Cancer of the uterus accounts for 19% and cancer of the breast for 18% of the cancer deaths in women. While cancer of the breast can occur in men, it is relatively rare.

When it comes to cancer of the stomach and digestive system, male deaths outnumber female by about 7,000 each year. U. S. Bureau of Vital Statistics reports for 1944 show 42,351 deaths among

men from cancer of the digestive system as compared to 35,637 among women. Finally, more men than women die of cancer of the skin, mouth and pharynx, lungs, nervous system, urinary tract and other sites.

One-fourth of the people attacked by cancer are saved by treatment with radium or X-rays or surgical operations. Another fourth die, but could be saved if the cancer were detected early and promptly treated. One-half of the people who meet with cancer, states the American Cancer Society, are dependent on new discoveries looked for from development of research. During this month the Society will put on a campaign to raise \$12,000,000 to support research, education and service for the fight against cancer.

Individuals should continue to make their own fight against cancer by consulting a doctor promptly if they have any of the symptoms that might mean cancer, such as unusual bleeding, persistent indigestion, persistent hoarseness, lump in the breast or unusual appearance of the breast, and a sore that does not heal promptly.

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BOTANY

White Pines Are Growing In Guatemala and Mexico

► WHITE PINES, usually thought of as distinctly northern trees, have recently been found growing on mountainsides in the tropics. Prof. Aaron J. Sharp of the University of Tennessee reports two communities of white pines in the mountain ranges of Guatemala, at elevations above 4,300 feet. Another group had previously been reported from Chiapas, southernmost Mexican state, by a Mexican botanist, Dr. Maximino Martinez.

Except for a slight difference in leaf structure, which marks them as a distinct variety, the trees are identical with the species *Pinus Strobus*, in which they are included, which reaches its southernmost known limit in the high mountains of northeastern Alabama and Georgia.

Prof. Sharp states that the two stands of pines he studied in Guatemala were associated with a number of other species of definitely northern aspect, such as boxelder, sweetgum, black cherry, sugar maple, oak, ash, elm, wild grape, dogwood, and several ferns familiar in the United States.

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IN SCIENCE

ASTRONOMICAL PHYSICS

Astronomers' Methods Aid Rocket Study Techniques

► TECHNIQUES used by astronomers studying the sun and other heavenly bodies are helping rocket studies, aimed at producing a missile superior to the Nazi V-2.

Problems which astronomical methods are helping solve for General Electric engineers studying rockets are how to take the temperature of rocket gases too hot for conventional instruments, and how to measure the velocity of the gases.

Adapted from the astronomers' measuring methods for the heat of distant stars and the speed of the sun's rotation, means of gathering information on the performance of rockets have been developed which will help in the design of more efficient motors and fuels.

Temperature of the rocket gases is taken by study of the wavelengths of molecular radiation. The light of the rocket flame is turned into a spectrum by means of lenses and prisms. Energy released by hydrocarbon molecules is recorded on a photographic plate and interpreted by means of a micro-densitometer, an intricate photoelectric device. In the V-2 rocket, the temperature of the gases is approximately 3,500 degrees Fahrenheit. Astronomers in the past have used a similar method to take the temperature of a comet's tail.

Wavelengths of the radiation from sodium atoms in the flame are photographed, using two periscopes, to help determine the velocity of the gases. Speed of the atoms approaching and leaving in the exhaust of the rocket are compared with stationary sources to calculate the velocity.

Basis of the speed determination procedure is the well-known Doppler effect, which uses the speed of an object toward or away from a certain point. Velocity of the superheated gases is compared with the velocity of light, as astronomers have calculated the speed of the rotation of the sun.

Dr. Francis P. Bundy and Dr. Herbert M. Strong, research physicists, devised the rocket test methods.

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THE FIELDS

VETERINARY MEDICINE

Blood Bank for Animals Provides for Transfusions

► A BLOOD BANK for horses, cows and dogs is operated at the State College of Washington as an aid to valuable animals that may become seriously sick, also as material for research in veterinary medicine.

Blood is collected, preserved and transfused by methods adapted from human medical practice. Animal donors are lightly anesthetized before blood is drawn from their veins, and great care is exercised to avoid draining too much from any individual. The blood is kept as whole blood until it is too old to be useful as such; then its plasma is withdrawn and preserved.

The animal blood bank had its inception not long before Pearl Harbor, but little has been made public about its work until now. It is maintained by successive groups of senior students, under the direction of Dr. J. E. McCoy.

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DENTISTRY

Daily Lemon Juice Dose Etches and Destroys Teeth

► DAILY LEMON juice drinking destroys the teeth, two dentists at the Mayo Clinic in Rochester, Minn., warn. The dentists are Drs. Edward C. Stafne and Stanley A. Lovstedt.

They report on 50 patients who were taking lemon juice as a health measure and who also showed evidence of their teeth having dissolved away. In one case the upper front teeth were destroyed to the gum line. This was a man who for years had drunk lemon juice in water on arising.

Of the 50 patients, 39 were women and 11 were men. They came from 22 states, two Canadian provinces, Mexico and Puerto Rico, suggesting that the use of lemon juice as a health measure or a remedy is widespread.

The use of lemon juice was most common among sufferers from rheumatism. It was also used by some of the 50 for treatment of constipation, to prevent and relieve colds and occasionally as a tonic.

In most cases the destruction of the teeth was found in a general physical examination, but in a few the dental defect was the reason the patient came to the clinic.

The etching and decalcification of teeth by the action of the acid in lemons has been noted long ago, but until recently this was limited to certain peoples and geographic regions. Now that lemons are widely available, they are being consumed to a much greater extent. Because of their vitamin C content, this has been a help on the nutritional score, the dentists point out. They state, however, that enough vitamin C can be got without resorting to improper use of lemons. By improper use they mean: 1. sucking on lemons, which is not very common; 2. taking lemon juice daily in appreciable concentration.

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OPHTHALMOLOGY

New Methods Find More Congenital Cataracts

► THE NUMBER of known types of congenital cataracts, which are to be found in every human eye, has been greatly increased in recent years by new scientific methods.

Increase in knowledge of the different types of congenital eye abnormalities has been made possible largely by the development of the slit-lamp and the corneal microscope for study of the dilated pupil, says Dr. Frederick C. Cordes, professor of ophthalmology in the University of California Medical School.

Most congenital cataracts are stationary and cause no interference with vision, many individuals never realizing they exist. Some such cataracts are simply dust-like opacities in the eye.

However, in 50% of cases there are other ocular disturbances, such as dimness of vision and involuntary movement of the eyeballs, Dr. Cordes states.

Some cataracts have a hereditary tendency, while others may be caused by injury, infection or toxic substances administered during pregnancy. Vitamin deficiencies in the mother and interference with her calcium metabolism can also cause cataracts.

"A clear lens, one in the sense of a good photographic or microscope lens, is probably non-existent in the human eye," Dr. Cordes states. "Practically all lenses, even those of young children, show some dust-like opacities."

Science News Letter, April 5, 1947

BIOLOGY

Single-Celled Animals Affected by Insecticide

► BENZENE HEXACHLORIDE, the new British insecticide, has strange effects on the single-celled citizens of the microscopic world, Dr. L. Lloyd of the University of Leeds has discovered. When paramecia, normally neat little slipper-shaped swimming animals, are kept in water containing the poison in dilutions of from one to ten parts per million, they lose their power to divide and form new individuals. Instead, they slowly grow larger, until they are 50% longer and broader than normal. After a while the poison finishes its work, and they die.

Freak forms have also been observed in some of the lower-strength solutions. Here the cells apparently have not entirely lost the drive for cell-division, but they cannot complete it, and produce "Siamese-twin" animals. If some of these doubled forms are placed in clear water, a veritable frenzy of cell-division takes place, with animals, and even separated parts of animals, produced in all sizes and a wide variation in abnormal numbers of body parts.

Science News Letter, April 5, 1947

ENTOMOLOGY

Insects' Shell Tanned With Exposure to Air

► WHEN YOU are spading up your spring garden you are very apt to turn up numbers of brown beetles and other insects with their shells still unhardened. Leave them exposed to the air for a while, and their shells will take on the stiffness you expect in insect bodies.

Chemically, this process is very similar to the toughening that takes place when raw hide is tanned into leather; proteins are acted upon by an acid and made harder and more impervious. The chemical nature of the hardening of insects' outer shells has been discovered by three Cambridge University zoologists, Drs. M. G. M. Pryor, P. B. Russell and A. R. Todd, who report on their investigations in *Nature* (March 22). In the insects which they have analyzed, the hardening agent has proved to be a complex compound based on dihydroxybenzoic acid linked with either acetic or lactic acid.

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BOTANY

Flowers We Fail to See

Easter's symbolism of the triumph of life over death can be seen in the tiny flowers of trees if you look carefully. Most stem from high up.

By DR. FRANK THONE

See Front Cover

► EASTER has always been a feast of flowers. Flowers are emblematic of the triumph of life over death, which is the primary significance of the whole Easter observance. Laid on a tomb, they speak of hope. Heaped on the altar, they sing of triumph.

Strangely enough, though, the flowers we always use at Easter are for the most part earth-bound. Lovely as they are, lilies and narcissi and tulips do not stand far above the ground, and even such early-flowering shrubs as forsythia and lilac and spiraea rise but little higher. We seldom gather flowers from trees, unless they are low trees with branches easily seized from the ground, like hawthorn and cherry and crabapple. Flowers that aspire nearest to heaven, on tall trees, we seldom seek.

Some Large Flowers

Some full-sized trees have flowers large and conspicuous enough to make a showing even at neck-craning distance; the waxy blossoms of magnolias, for example, or the showy clusters of horse-chestnuts and catalpas.

But the flowers of most large trees are not only borne high up, they are also so small and inconspicuous that few persons outside the professional ranks of botanists and foresters pay any attention to them. Their roster is a notable one: all the conifers, all oaks, hickories, maples, beeches, elms, poplars, willows, hackberries, walnuts, sycamores—in fact, almost all trees that figure importantly in the makeup of our native forests.

There is good cause for this, if you accept either the evolutionary doctrine that structures without survival value to the organism are themselves unlikely to survive, or its more simply-stated philosophical opposite number, that "everything has its use." Most of the trees in this list, and many others besides, are wind-pollinated. Needing no help from insects, their flowers lack the lures of bright petals, sweet odors and tempting nectar that attract insects to the kind of

flowers that most of us think of as "really flowers."

Small But Beautiful

Small and inconspicuous though these usually unnoticed flowers are, they have beauties of their own, as all well-adapted, functional structures are likely to have. These hidden symmetries can be spied out with a good hand lens, or recorded permanently with a medium-power enlarging lens on a camera. Prof. Walter E. Rogers' "Tree Flowers," published a dozen years ago, is a classic of this kind of photography; more recently Dr. W. M. Harlow of the New York State College of Forestry has also done some notable work along this line.

Brought up to a scale that the human eye can perceive and appreciate, these tiny flower-parts can be great stimulants to the imagination. The styles on a chestnut's female or pistillate flower, shown on the cover of this SCIENCE NEWS LETTER, reach out like pale, supple fingers; willow seed-clusters, seen enlarged on the cover, group into a flame-like plume; an individual floret



HOLLY FLOWER—If the flowers of this tree were as large as cherry blossoms, holly would be as highly esteemed for them as it is now for its berries. Pictures by Prof. Walter E. Rogers.

from; the dogwood's flower-cluster looks like a miniature Greek vase in porcelain or carved ivory; twin sacs filled with pollen in almost any staminate flower are the gold-bags of a miser until they burst—then they are a spendthrift's pockets.

Not all these small but beautiful flowers belong to the group that lets the wind do their wooing. Some of them are fair copies of more conspicuous blossoms that depend on insect cooperation, with sepals and petals as well as the indispensable reproductive parts, the stamens and pistil.

Such a one, for example, is the holly flower. Enlarged to a more easily visible size, it becomes an even competitor with any cherry or apple blossom. It was appreciated as long ago as the sixteenth century, as witness two verses in the old Christmas carol:

"The holly has a blossom
As fair as the lily flower."

One interesting thing is brought out by a magnifying-glass examination of holly flowers: Although holly trees and bushes are separately either male or female, it was evidently not always so. For the female flower, that forms the berry, has four stamens as well as its pistil; but their anthers are withered and never produce any pollen. Similarly, the male flower, with its functional stamens, also has the nub of a pistil, which is of course barren.

Sweet Scent

Some of these small flowers that nevertheless attract insects make up for their lack of conspicuousness with intensified odor. As late spring turns the corner toward full summer, go out to a linden tree, or to a flowering grapevine. Either of these, when in full bloom, will pour forth a flood of sweet scent that is intoxicating even to dull human nostrils. No wonder that the more scent-sensitive bees and small moths go as mad over them as a cat over a catnip ball!

While some of the small, wind-pollinated flowers, like those of willows, alders, elms and poplars, come in plenty of time for Easter, and even weeks before that, wind pollination is not necessarily an early-season phenomenon. Most oaks, for example, bloom in May, when there are plenty of insects around, and plenty of insect-pollinated flowers for

them to work on. Many of the conifers, too, toss their clouds of yellow pollen to the breeze when it has been warmed up a bit.

It used to be thought that "imperfect" flowers, dependent upon the wind for pollination, were relatively primitive and "simple"—the marks of earliest-evolved seed-plants. There is no question that the earliest-evolved seed-plants were wind-pollinated—the insects that existed in those times were ill adapted to the job of carrying pollen. But to conclude from that fact generalization that all wind-pollinated plants are primitive is a case of reasoning backward: certain wind-pollinated families, such as grasses and sedges, are relatively highly evolved; and it is becoming apparent that some of the wind-pollinated trees, like oaks and hickories, merit consideration above

the humble rank to which they were assigned by earlier botanists.

Although we may need the aid of a magnifying glass to see their tiny flowers, there is no need for magnification of the importance of wind-pollinated plants. To this group belong all grains, the beets and the cane that are the sources of almost all of our sugar, the palms that yield us nuts for oil and dates for food, such fiber plants as hemp and ramie, all softwoods and most hardwood trees, the grasses that form our pastures, lawns and golf courses, and most of the shade trees that line our streets and fill our parks. We may lavish our attention on the plants with showy flowers, but it is the ones without such adornment that really make human (and animal) life on this planet possible.

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DECEIVING DOGWOOD—Things are not what they seem: this is the real flower of the flowering dogwood.

MEDICINE

A-Bomb Story Not Yet Told

Four or five generations may pass before the full effects of A-bombs will be felt. Jap babies show no abnormalities traceable to radiation.

► EVERYONE ALIVE in the world when the atomic bombs fell on Hiroshima and Nagasaki may be dead before it is known definitely whether Jap babies are going to be born deformed or abnormal because of A-bomb damage to their parents' germ-cells.

The effects of such damage may not show up for several generations. At 20 years to the generation, it may be 100 years before abnormalities, if they do occur, will appear in descendants of the atomic bombing survivors, it is thought.

This is because the changes, or mutations, which irradiation can bring about in some species of life, such as fruit-flies, are in most cases recessive and may go undetected for several generations.

The fact that some deformed babies have been born in Japan since the A-bombings does not mean that the deformities or abnormalities were the result of the bombings. Members of the Atomic Bomb Casualty Commission, who have just completed a special study of the situation in Japan, found no more cases of such abnormalities than would be normally expected. In any population, it was pointed out, there are always a certain number of individuals born who are not fully normal.

Sterility of a temporary nature appar-

ently occurred, the Commission found from autopsy studies made on those who died within a few weeks after the bombings. Whether any survivors will be permanently sterilized cannot be determined yet.

Starvation and infectious diseases are sterility factors which were present at the time of the bombings. If sterility does occur, it may be difficult or impossible to determine the part played by these factors and the part played by radiations from the bombs.

Members of the Commission were: Dr. Austin M. Brues of the University of Chicago and the Argonne National Laboratory; Dr. Paul S. Henshaw of the Clinton Laboratories, Oak Ridge, Tenn.; Lieuts. Melvin A. Block and James V. Neel (MC), U. S. Army, and Lieut. (j. g.) Frederick W. Ullrich (MC), USNR.

Concrete affords such a degree of protection that a person within a concrete building 500 meters (slightly under one-third of a mile) from the ground center of the explosion fared no worse, on the average, than a person standing in the open 1,400 meters distant from the blast.

A large number of burns suffered by the victims, the Commission found, healed with the accumulation of large

amounts of elevated scar tissue, called keloids. Whether these are forerunners of cancer and why they occurred are unanswered questions.

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PHYSICS

Air Pressure Measures Roughness of Surfaces

► A NEW LABORATORY instrument called a rugosimeter, for measuring the roughness of surfaces, is offered by Dr. Melvin Mooney of the United States Rubber Company for patent 2,417,988. Air under pressure is blown through an opening in the middle of a smooth plate applied to the surface to be measured. The rougher it is, the more openings for air flow it will offer; hence a pressure gauge can be used to give an integrated reading of the surface's roughness.

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A new chemical compound to improve wear and waterproof *shoe soles* includes raw linseed oil, castor oil or cottonseed oil, varnolene (a petroleum derivative), pine tar and benzaldehyde.

One of the most acute *housing* shortages in the world is in Rio de Janeiro, Brazil; this Brazilian capital has increased a half-million in population in the past few years.

Two young bulls and two heifers of the *Red Sindhi* breed have been brought to America to start an experiment in developing better dairy cattle for southern climates.

The great gray marsupial *frog* of the Orinoco river country has an area beneath the skin of the lower back where eggs are deposited and hatched, and from which the developed young emerge through a temporary slit along the back.

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MEDICINE

Aspirin Starts Blood Flow

➤ WHEN BLEEDING starts up two or three days after a tooth has been pulled, it probably is because the patient has been taking aspirin or some related drug to relieve pain.

Studies showing this are reported by Dr. Gustav William Rapp of the Chicago Dental College, Loyola University, in the *Journal of the American Dental Association* (April 1).

It should be possible to prevent the delayed bleeding, Dr. Rapp states, by giving proper doses of synthetic vitamin K, the so-called anti-bleeding vitamin.

Patients who have considerable bleeding after removal of tonsils probably owe this to the aspirin they have been taking to relieve the pain after the operation, Dr. Rapp points out, referring to a report by another scientist, Dr. Rudolph Singer of Vienna who joined the U. S. Army Medical Corps.

Dr. Singer made what Dr. Rapp calls "the remarkable observation" that the high frequency of hemorrhage after tonsil removal in America as contrasted to its infrequent occurrence in Europe is probably because American doctors prescribe acetylsalicylic acid (aspirin), alone or with other drugs, for relief of pain after the operation. European doctors almost always prescribe a different drug, aminopyrine (Pyramidon) for this purpose.

Salicylic acid, Dr. K. P. Link and associates at the University of Wisconsin have discovered, causes a deficiency of prothrombin in the blood. When there is too little prothrombin, the blood clots slowly. Bleeding is prolonged and the clot formed is fragile.

Vitamin K can overcome this because it stimulates production of prothrombin.

Following these clues, Dr. Rapp made some tests on 40 apparently normal students. He gave some of them tablets containing acetylsalicylic acid, acetophenetidin and caffeine, such as are prescribed by many dentists for relief of pain. He gave others the same tablets plus tablets of synthetic vitamin K. Just before this and every day for six days after, he tested their blood for prothrombin.

Those getting the acetylsalicylic acid mixture developed an acute deficiency of prothrombin in their blood. This showed up within one and one-half to two days after taking the tablets. It lasted for longer than five days. The clotting time

in these students was nearly double the normal.

The prothrombin deficiency could be prevented by taking synthetic vitamin K with each tablet of the acetylsalicylic acid mixture.

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GENERAL SCIENCE

Science Foundation Bill Takes Step in Congress

➤ A NATIONAL science foundation bill has been reported out of the Senate labor-public welfare committee and has gone on the calendar.

This may be the first step to federal financing in peace of basic research such as paid dividends during the war. Last year a science foundation bill passed the Senate and died in House committee.

The Senate bill is a modification of S. 526 introduced by Sen. H. Alexander Smith, R., N. J., and contains some features of the rival bill authored by Sen. Elbert Thomas, D., Utah.

The bill reported would create a foundation of 24 scientists serving on a part-time basis.

The House committee considering similar science foundation bills has not yet reported, since testimony at hearings extending over two days has not yet been printed. The Senate committee did not hold hearings.

A survey by the Inter-Society Committee for the science foundation, representing 75 scientific organizations, shows that two-thirds of the representatives in that committee favor a full-time administrator rather than a part-time board in control of the foundation. This is the organization proposed in last year's bill and in the Thomas bill.

But the scientists are willing, if necessary, to accept a commission form of administration, which is alternate choice of 95%, or a board, which is alternate choice of 86%.

Allowing the foundation to include the social sciences, which the reported bill is expected to do, met with 99% approval.

Patent legislation should not be included in the bill in the opinion of 94% of the scientists, and 86% are in favor of the foundation granting undergraduate scholarships.

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ARBORICULTURE

Seventy-Five Arbor Days

By setting out young trees, children will celebrate Arbor Day, 75 years old on April 10 this year. It was started by Julius Sterling Morton.

► ARBOR DAY, observed annually by thousands of school children who set out young trees to grow up with themselves, will see its seventy-fifth anniversary on April 10 of this year. On Jan. 4, 1872, the Nebraska state legislature, spurred by tree-loving Julius Sterling Morton, set aside April 10 as the first Arbor Day, offering prizes for the largest number of trees properly planted on that day.

In 1885, the Nebraska legislature changed Arbor Day to fall on Mr. Morton's birthday, April 22. Dates of observance in other states necessarily vary according to the planting season, being as a rule earlier in the South than in the North. The Arbor Day idea has spread outside the United States, and has taken hold in countries as far apart as New Zealand and Spain.

Sterling Morton, as he was usually called, was born in New York and educated in Michigan, but migrated to the then new Territory of Nebraska in 1854, when he was 22 years old. The poverty of the prairie country in trees, and the resulting inconveniences suffered by the

settlers, impressed him greatly, and with all the enthusiasm of youth he began his crusade for growing crops of trees.

He led the way by personal example, planting in the new-turned prairie soil every kind of tree seedling and cutting he could get. He used a small newspaper which he owned as a pulpit to spread his gospel. He insisted on proper planting and year-round care. When he was called to Washington in 1893 as Secretary of Agriculture in President Cleveland's cabinet, he continued to agitate for tree planting in the East as he had in the West.

Arbor Day has been made so largely a school celebration primarily to impress upon the new generations of citizens the need for more trees and more knowledge about trees. However, since the actual plantings made by pupils in school can hardly be more than tokens, the real responsibility for large-scale plantings that will really restore some measure of America's once great wealth in trees must continue to rest with owners of lands capable of producing mass timber crops.

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down to the shore and tries to make measurements. Currents, tides, winds and other factors always make differences in water level at different points along any shoreline, and these are apt to be especially marked along the opposite shores of channels. So it is simpler to shut a column of water away from these disturbances by isolating it in a tube and thus establishing a true hydrostatic balance.

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GEODESY

Tube Measures Levels

► NEW INFORMATION about the Gulf Stream could be obtained if a slender tube filled with water were laid like a submarine cable under the narrowest part of the Straits of Florida, through which pours the current that eventually becomes the famous "river of the sea". This suggestion is made by Dr. R. B. Montgomery of the Woods Hole Oceanographic Institution in *Nature* (March 22).

Such a water-filled tube, less than a half-inch in diameter, has already been used in Denmark for measuring the comparative heights of points on land on opposite sides of a strait. The method was originated by Dr. N. E. Norlund of the Danish Geodetic Institute at Copenhagen.

The operation of this device depends on the principle known as the hydrostatic

balance, taught in every high-school physics course. Essentially, this principle is that the level of a liquid in two arms of a U-shaped tube is always the same, no matter how far apart they are. Of course, when the ends are miles apart, measurements have to be corrected for differences in temperature and barometric pressure when really precise levels are to be determined.

What would be demonstrated by the use of a Norlund tube under the Straits of Florida is the degree of piling-up on shore of water pushed through in the swift current, Dr. Montgomery states.

The Norlund tube is particularly useful in determining true heights of points on land above sea level. There is a great deal of difference between the theoretical mean sea level and what an observer actually sees if he takes his instruments

Atoms, Planets & Stars

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► AT EASTERTIDE we memorialize Christendom's ancient faith in "resurrection, and life everlasting" with such symbols as eggs and little chicks, flowers that spring from seeming-dead bulbs, and rabbits that leap forth out of the dark earth.

Strangely enough, however, one of the



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oldest of Christian immortality-symbols has long been neglected: the butterfly, that breaks the winding-sheet of the cocoon and glories in the new sun. The symbolism is older than Christianity, as a matter of fact: to the Greeks, who also believed in immortality, the word Psyche meant both "soul" and "butterfly." It is quite likely that the butterfly-symbols found here and there in early Christian art were brought in by Greek converts who had heard the sermons, or read the letters, of St. Paul.

Butterflies should be a really good symbol of our concept of the spirit. They are beautiful, they almost seem to float through the air rather than fly, when they do condescend to alight it is usually on a flower, and when they feed it is upon nectar. True, Easter is usually too early in spring for many butterflies to be out and about; but at least we could have their painted or printed images added to the usual floral decorations.

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AERONAUTICS

Aircraft Noise Reduced By Changing Approaches

► PROGRESS is reported in the elimination of the noise nuisance of low-flying planes in the neighborhood of airports.

Noiseless planes have not yet been developed although abatement of noise is promised, with new types of propellers under test and with mufflers on aircraft engines.

The present progress comes from government activities to control flying altitudes and approach lanes used by pilots in airport vicinities. The U. S. Civil Aeronautics Administration reports that it finds that much of the annoyance to persons on the ground is eliminated by changing the "traffic pattern" around airports, "and by pilot cooperation in using suitable power and propeller-pitch settings."

Civil air regulations forbid flying below 1,000 feet over congested areas "except when necessary for taking off and landing." Most of the nuisance noise, however, occurs during landings and take-offs from fields close to residential areas. In many cases, the nuisance is lessened by using approach air lanes over water, industrial sections and wastelands. Where this has been done, complaints have been eliminated. Most pilots and airport operators, CAA states, have co-operated wholeheartedly in its program.

Airplane noise comes from two sources, the propellers and the engine exhaust.

Propeller noise dominates engine exhaust noise even though the exhaust has a relatively high intensity. To reduce the total noise, it will be necessary to modify the propeller to operate at low tip speeds, and to have a large number of blades, the National Advisory Committee for Aeronautics has determined. An effective engine muffler will also be required.

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CHEMICAL ENGINEERING

Iron-Smelting Process Uses Heated Oil Fuel

► IRON is extracted from ores of high oxygen content, like limonite and magnetite, by a process using oil heated to the cracking-point as part of its fuel, on which U. S. patent 2,417,949 has been granted to Elfego Riveroll of Hermosa Beach, Calif.

Reduction of the ore is carried out in three steps. First the ground-up ore is fed through a chamber where it meets high-temperature flame that drives out all water present and loosens up its texture. Then it passes to a second chamber where it is mixed with oil heated to the cracking-point; the released carbon and hydrogen atoms seize upon part of the ore's oxygen, thus beginning the reduction process. Finally, in a third chamber that is really an electric furnace from which all oxygen has been excluded, it is further heated in the presence of coke or other form of solid carbon, which completes the reduction.

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MEDICINE

X-Rays and Colchicine Together Affect Cells

► X-RAYS and colchicine used together can have effects on growing cells that neither the rays nor the drug produces alone, Dr. A. Back of the Cancer Laboratories of the Hebrew University in Jerusalem has discovered. He announces his findings in *Growth*.

In his experiments, Dr. Back sprouted one lot of onion seed in water containing one-quarter of one per cent of colchicine, and another lot in plain distilled water. After the initial root had started to grow, both lots were given an X-ray exposure of 2,000 roentgens. Growth of the untreated roots was checked little or not at all by the X-rays, whereas there was notable inhibition of the colchicine-treated roots.

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Books of the Week

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AUDIO-VISUAL AIDS IN THE ARMED SERVICES—John R. Miles and Charles R. Spain *Am. Council on Education*, 96 p., illus., paper, \$1.25. Wartime necessity taught many through the use of visual, auditory, and tactile aids; this report of the Commission on Implications of the Armed Services Education Program explores these lessons with a view to their place in peacetime education.

CARNEGIE INSTITUTION OF WASHINGTON, YEARBOOK no. 45: July 1, 1945-June 30, 1946—*Carnegie Inst.*, 235 p., tables, paper, \$1; cloth, \$1.50.

FIRST PENTHOUSE DWELLERS OF AMERICA—Ruth Underhill—*Southwestern Monuments Assn.*, 160 p., illus., \$4.25. Long out of print, this revised edition tells the story of the Pueblo Indians, their life, customs, and history. It is a handsome book with thoughtfully chosen photographs.

FIRST YEAR QUALITATIVE ANALYSIS—Carl J. Likes and Aubrey E. Harvey—*Crowell*, 134 p., a textbook written for colleges where qualitative analysis is included as the latter part of a first-year general chemistry course.

FOUNDATIONS OF DEMOCRACY—F. Ernest Johnson, ed.—*Inst. for Religious and Social Studies*, 278 p., \$2. An analysis of the historical, philosophical and religious sources of democracy.

FUNDAMENTALS OF PLASTICS—H. M. Richardson and J. Watson Wilson, eds.—*McGraw-Hill*, 483 p., illus., \$5. This survey for students includes four sections: relationship of chemical structure to physical properties, the six classes of plastics, commercial manufacture, and an evaluation of testing methods.

A HANDBOOK OF COMMONLY USED DRUGS—Michael Pijoan and Clark H. Yaeger—*Thomas*, 182 p., \$3.75. A small compact book for use where standard texts on pharmacology are unavailable, it deals with drugs, their usage, preparation and techniques and is the result of experience in field expeditions.

HUMAN GENETICS—Reginald Ruggles Gates—*Macmillan*, 2 vols., illus., \$15. Using embryology, morphology, physiology, biochemistry and anthropology, this comprehensive work explains the development and

inheritance of both normal and abnormal conditions.

INSECTS OF GUAM—II—Bernice P. Bishop *Museum Bulletin* 189—*Bishop Museum*, 237 p., illus., paper, \$2.50. The discussions include about 470 species of which 94 are described as new; the material is mainly from collections made in Guam by D. T. Fullaway and O. H. Swezey and Usinger.

MESON THEORY OF NUCLEAR FORCES—Wolfgang Pauli—*Interscience*, 80 p., \$2. A collection of the author's lectures at M. I. T. serve to give students and research workers an introduction to the theory of the interaction of mesons with protons and neutrons (nucleons) and the interactions between nucleons derived from it.

MUSICAL ACOUSTICS—Charles A. Culver—*Blakiston*, 2nd ed., 215 p., illus., \$3. A textbook for music students applying fundamental laws of acoustics to this field.

THE POETRY OF MATHEMATICS AND OTHER ESSAYS—David Eugene Smith—*Scripta Mathematica*, 90 p., \$1.25. These articles, while not in themselves mathematical, relate to lines of interest which mathematics suggests.

RADIO-CRAFT LIBRARY, Nos. 29, 30, 32, 33, 36, 37, 38—Editors of *Radiocraft*—*Radiocraft Publ.*, 64 p., illus., paper, each 50 cents. Titles: Handy Kinks and Short Cuts, Unusual Patented Circuits 1944-1946, Advanced Service Technique, Amplifier Builder's Guide, Radio Test Instruments, Elementary Radio Servicing, How to Build Radio Receivers.

RAW MATERIALS FROM THE SEA—E. F. Armstrong and L. M. Miall—*Chemical Pub.*, 196 p., illus., \$3.75. The chemical problems represented by the oceans are discussed, the substances present in them in minor quantities, and their winning from the sea.

TEN GREAT INVENTIONS, *National Machine Tool Builders' Assn.*, 30 p., illus., paper, free. Ten historical inventions are described which were introduced shortly after the invention of basic machine tools.

THE TREATY OF VERSAILLES AND AFTER: Annotations of the Text of the Treaty—U. S. Dept. of State—*Govt. Printing Office*, State Dept. Publ. No. 2724, 117 p., \$3.25. This historical document was prepared for the delegates to the Foreign Ministers Conference in Moscow; it should clarify the treaty.

UNITY AND DIFFERENCE IN AMERICAN LIFE—R. M. MacIver—*Inst. for Religious and Social Studies*, 167 p., \$2. Three sections cover the common ground, the dividing issues, and what we can do about them.

THE WALLACES OF IOWA—Russell Lord—*Houghton*, 615 p., illus., \$5. The three generations of Wallaces, covering a century of history and growth of America, are portrayed here.

THE WORLD AT THE CROSSROADS—A. Blaine, E. H. Cassels, E. R. Embree, W. W. Waymack, Q. Wright—*World Citizens Assn.*, 160 p., paper, 25 cents. The execu-

tive committee of this organization states the present situation of the world with respect to peace, urges all to accept and support the United Nations, and states the aims of the World Citizens Association.

Science News Letter, April 5, 1947

PHYSICS

System Promises to Make All Ports Free of Ice

► RUSSIA'S ENDLESS quest for an ice-free port may have been solved, without need for territorial expansion, by a Swedish invention on which U. S. patent 2,417,519 has been issued. If it works out as described, it would make ice-free ports of Leningrad or Vladivostok or any harbor on any wintry coast.

The invention is the work of Bengt O. E. Persson of Enebyberg and Erik Forslind of Stockholm. It consists simply of long lines of perforated pipes laid under the channel to be kept ice-free. Air is pumped through the pipes. As the bubbles rise in streams from the perforations they pull currents of water upward along with them. This water, which is above thawing temperature, displaces the thin stratum of cold water immediately under the ice, and proceeds to melt a clear channel. If used early enough in the winter, it can prevent the initial formation of ice, the inventors claim.

Science News Letter, April 5, 1947

Water in which houseplant cuttings are rooted should be changed frequently so that oxygen will be available for the rooting.

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✿ **TRANSPARENT** plastics have entered new fields. One type is used to make 300-gallon olive brine vats; another to make storage tanks for a chlorine bleaching solution. They are free from reactions with the chemicals used, and the contents can be seen continually.

Science News Letter, April 5, 1947

✿ **AIRPLANE** reading lamp is a peacetime version of the wartime gunsight lamp. Inserted over the passenger's head, the new 20-watt lamp provides almost 10 times the illumination of lamps of the same wattage previously used.

Science News Letter, April 5, 1947

✿ **CORN CUTTER**, a household device to remove green corn from the cob, has a saddle base hollowed to fit over the ear, and a raised handle for pushing it forward. A cutting edge is set at a proper depth below an opening in the center of the base.

Science News Letter, April 5, 1947

✿ **GARDEN HOE**, recently patented, has a spring loop in the lower part of its handle that absorbs shocks, strains and vibrations in use.

Science News Letter, April 5, 1947

✿ **IMPROVED abacus**, with braille column-indicators on the frame for use by the blind, is a simplified type for busy executives to use in adding, subtracting,



multiplying and dividing. The fifth and sixth digit disks on each rod, as shown in the picture, are larger than others to speed operation and particularly to assist the blind.

Science News Letter, April 5, 1947

✿ **BABY WALKER** recently patented, can be used for a go-cart, rolled on its four casters. The metal framework that holds the child carries a suspended seat with leg holes for walking. The insertion of a foot board and handles converts it into a go-cart.

Science News Letter, April 5, 1947

✿ **THICKNESS GAGE**, to measure electrically from the outside the thickness of iron and steel pipe from one-quarter to two inches in diameter, includes an indicating instrument, a gage head, and a saddle connected to the gage head by two screws. Different saddles, which must fit the pipe, are required for each diameter.

Science News Letter, April 5, 1947

✿ **WIRE STRIPPER**, for removing cotton, silk, plastic or rubber insulation from electric wires by a continuous process, makes use of two electrically heated stripping blades. Fumes and smoke created in the process are drawn away by a built-in exhaust, and strippings fall into a water compartment.

Science News Letter, April 5, 1947

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